Regional resistivity structure of the Tibetan Plateau

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Modern magnetotelluric measurements have been made on the Tibetan Plateau since INDEPTH's Phase II in 1995 (Chen and others, 1996), using both broadband MT (BBMT) and long period MT (LMT) instrumentation. The MT interpretations of the data from the 1995 Yarlung-Zangbo suture profile on those 100 and 200 lines (Chen and others, 1996) were the definitive results that led to the influential Nelson and others (1996) interpretation of partial melt north of the suture. Field campaigns during Phase III resulted in MT acquisition from southern Tibet across the top of the Plateau to the Qaidam Basin north of the Kunlun Fault (Wei and others, 2001; Unsworth and others, 2004). Optimally smooth models of the MT data from these profiles showed pervasive mid-crustal low resistivity, taken as evidence of extensive partial melting (Li and others, 2003) across the whole central plateau from the Yarlung-Zangbo suture to the Kunlun Fault. Detailed analyses and modelling of the data across the Yarlung-Zangbo suture (Spratt and others, 2005) and the Bangong-Nujiang suture (Solon and others, 2005) demonstrated the geometrical complexity and lateral variation of the mid-crustal conductive layer, indicating strong structural control.

Optimally smooth models from four profiles crossing the Yarlung-Zangbo suture from the Northwestern Himalaya at 77° E to the INDEPTH profiles at 92° E along over 1,000 km of the southern margin of the Tibetan plateau show remarkable similarity (Unsworth and others, 2005), testifying to the uniformity of regional-scale processes.

Recently, the INDEPTH MT data (Fig. 1, blue squares) have been augmented by BBMT measurements by the China University of Geosciences Bejing (CUGB). These MT measurements have been made across the central part of the plateau west of the INDEPTH 400 and 600 profiles essentially along the Bangong-Nujiang suture, and along the Yarlung-Zangbo suture both to the west and east of the INDEPTH 100 and 700 profiles with two additional suture-crossing profiles (Fig. 1, red circles). Images at various depths have been generated from these INDEPTH+CUGB data of the regional resistivity variations across the Plateau. The crust exhibits lateral variations on rather small wavelengths, whereas the mantle exhibits strikingly strong east-west and north-south variation, with resistive mantle to the east and north, and more conducting mantle in the centre and west.

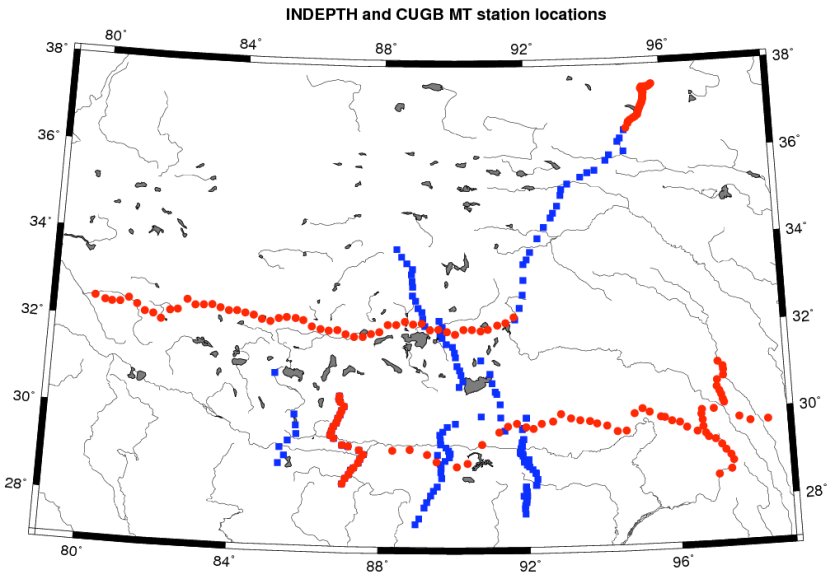

Figure 1. Modern MT site locations on the Tibetan Plateau. **Blue squares** are those of INDEPTH, and are a mixture of BBMT-only and BBMT+LMT. **Red circles** are those of CUGB, and are BBMT-only.

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